

# PATENT SPECIFICATION

DRAWINGS ATTACHED

857.992



Date of Application and filing Complete Specification July 25, 1959.

No. 25590/59.

Complete Specification Published Jan. 4, 1961.

Index at acceptance:—Class 98(1), R1B.

International Classification:—H05g.

## COMPLETE SPECIFICATION

### Apparatus for the Radio-Active Radiation Treatment of the Inner Cavities of a Body

#### ERRATUM

SPECIFICATION No. 857,992

Page 1, line 1, for "Büsch" read "Rüsch"

THE PATENT OFFICE

24th February, 1961

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ment
- 15 is intended for the radio-active radiation treatment of determined places inside the body. Hitherto, for example in the therapeutic treatment of the oesophagus the radiating means has been located directly in the oesophagus, and in fact in such a way that the upper surface of the source of the rays contacts directly on the mucous membrane, or comes very close to it. Hitherto, among other things, radio-activated cobalt beads have served for this purpose, such beads being assembled on a silk thread and the assembly swallowed by the patient.
- 20 Since in general, the effect of the rays is strongest in the vicinity (e.g. on the upper surface) of the radio-active material, and the drop in effect very quickly proceeds within the tissue, the highest amount of dose comes directly on to the mucous skin, or immediately below it. The lower tissue penetrated for the most part by tumour infiltration, and the connected lymph system which comes into question for the metastasis of the tumour, is thus provided with too little radiation, because of which considerable disadvantages may result.
- 25 Devices for the radium irradiation of womb cancer are already known which consist of a tube-like metal device in which several filter tubes serving for receiving the radiation material are firmly built in. Any accurate adjustment of the source of radiation relatively to the part of the body to be treated is thus very difficult, because the said source
- mouth. This holder consists likewise of metal and, as a radium carrier, a disc or capsule is used which is fixed on a handle. For the introduction into other cavities of the body, this device is neither intended nor suitable.
- For the latter purposes, a radio-active rubber catheter has already been developed in which inactive cobalt is located in a mixture and then activated. Thereby the whole instrument becomes radio-active and thus a localisation of the effect is not possible.
- The present invention relates to a device for the radio-active radiation treatment of body cavities by means of a source of radiation located in a hollow body and extending in the longitudinal direction of such hollow body, which device consists of a resilient gut or gullet tube in which is a source of radiation embedded inside a completely closed tube or sleeve of radio inactive material, such closed tube being movable relatively to the gut or gullet tube from outside.
- By this arrangement, the strength of the dose of the radiation may be increased or decreased as required in that the distance between the source of radiation and the object of radiation can be regulated. At the same time, it is possible in this way to extend the effect of radiation linearly over a large distance as desired, and thereby also effectively to radiate the field in question for the metastasis and the infiltrated growth. By this arrangement, a far better effect in depth
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### Apparatus for the Radio-Active Radiation Treatment of the Inner Cavities of a Body

I, WILLY BÜSCH, a German citizen, of Rommelshausen b. Stuttgart, Germany,, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a surgical or therapeutic instrument serving for the treatment of the human body, which instrument is intended for the radio-active radiation treatment of determined places inside the body. Hitherto, for example in the therapeutic treatment of the oesophagus the radiating means has been located directly in the oesophagus, and in fact in such a way that the upper surface of the source of the rays contacts directly on the mucous membrane, or comes very close to it. Hitherto, among other things, radio-activated cobalt beads have served for this purpose, such beads being assembled on a silk thread and the assembly swallowed by the patient.

Since in general, the effect of the rays is strongest in the vicinity (e.g. on the upper surface) of the radio-active material, and the drop in effect very quickly proceeds within the tissue, the highest amount of dose comes directly on to the mucous skin, or immediately below it. The lower tissue penetrated for the most part by tumour infiltration, and the connected lymph system which comes into question for the metastasis of the tumour, is thus provided with too little radiation, because of which considerable disadvantages may result.

Devices for the radium irradiation of womb cancer are already known which consist of a tube-like metal device in which several filter tubes serving for receiving the radiation material are firmly built in. Any accurate adjustment of the source of radiation relatively to the part of the body to be treated is thus very difficult, because the said source

is not itself movable inside the device. In addition, the effect acts substantially outwards at these places at which the tube is perforated, and thus a uniform distribution of the effect along the whole surface of the radiation body is not possible.

For the treatment of mouth cavities and of the top of the throat, devices are known which consist essentially of a holder for a radio-active material to be introduced into the mouth. This holder consists likewise of metal and, as a radium carrier, a disc or capsule is used which is fixed on a handle. For the introduction into other cavities of the body, this device is neither intended nor suitable.

For the latter purposes, a radio-active rubber catheter has already been developed in which inactive cobalt is located in a mixture and then activated. Thereby the whole instrument becomes radio-active and thus a localisation of the effect is not possible.

The present invention relates to a device for the radio-active radiation treatment of body cavities by means of a source of radiation located in a hollow body and extending in the longitudinal direction of such hollow body, which device consists of a resilient gut or gullet tube in which is a source of radiation embedded inside a completely closed tube or sleeve of radio inactive material, such closed tube being movable relatively to the gut or gullet tube from outside.

By this arrangement, the strength of the dose of the radiation may be increased or decreased as required in that the distance between the source of radiation and the object of radiation can be regulated. At the same time, it is possible in this way to extend the effect of radiation linearly over a large distance as desired, and thereby also effectively to radiate the field in question for the metastasis and the infiltrated growth. By this arrangement, a far better effect in depth

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is attained than with the hitherto known radiation devices, the beta radiation being completely absorbed in the material surrounding the radiation means.

5 For the purpose of the said relative movement of the source of radiation within the outer tube, a fine wire or thread or other suspension means may be used, accessible from the outside, to which the inner tube carrying the radiation means is connected.

10 By means of the elastic outer tube surrounding the radiation means, such means is kept at a certain distance from the mucous membrane whereby, by changing the outer covering the distance from the tumour to such means may be regulated from time to time. By mutual movement of the tubes lying on one within the other, the radiation means (whose position can be shown without difficulties by X-ray observation) can be brought satisfactorily into the correct position relatively to the tumour.

For obtaining flexibility as much as possible, the radiation means, for example a radio-activated cobalt wire, may be sub-divided into a large number of small pieces separated from one another by small spaces, or a thin wire of sufficient flexibility in itself may be selected. Instead of cobalt, another gamma radiating means may be used. The radio active element is advantageously coated electrolytically with an inactive non-oxidising metal coating, preferably gold so that, on damaging of the sleeve it can be withdrawn and inserted without trouble into another applicator.

35 In the same way as for the treatment of the oesophagus the device according to the invention may for example be used for the treatment of the rectum, in which case the radiation ratios, in consequence of the greater width of the rectum, may be formed particularly advantageously.

Two embodiments of the device according to the invention are illustrated diagrammatically in the accompanying drawing as longitudinal sections:—

Fig. 1 shows a gullet tube with sub-divided radiation means; and

50 Fig. 2 shows a similar tube with a radiation means in one piece.

In both figs., the outer resilient sleeve is indicated by 1, as a part of a gut or gullet tube of rubber or of a suitable synthetic material, preferably having a basis of polyethylene. 2 is the inner tube or sleeve which is formed as a cylindrical body closed at its ends and which, with regard to satisfactory slidability, is preferably made of a suitable

elastic synthetic material, and is moved as required within the surrounding outer tube by means of a thin wire or thread 3. It can thereby be brought to any desired place.

Inside the sleeve 2, according to Fig. 1, there is a radiation body extending linearly and made of radio activated cobalt wire or the like, which is composed of individual short small pieces 4 with small spaces in between so that it can easily adapt itself to the bends of the gullet tube when being introduced into the throat.

Instead of this interrupted radiation insert there is, according to Fig. 2, a correspondingly thin continuous wire 5 which likewise can easily follow the bends of the gullet tube.

#### WHAT I CLAIM IS:—

1. A device for the radio active radiation treatment of body cavities by means of a radiation source located in a hollow body and extending in the longitudinal direction of such body, characterised in that it consists of a resilient gut or gullet tube or catheter in which the source of radiation is embedded within a completely closed tube or sleeve of radio inactive material, said tube or sleeve being movable from the outside of the device relatively to the gut or gullet tube.

2. A device according to Claim 1, characterised in that the source of radiation is inserted firmly in a cylindrical sleeve of rubber or synthetic material.

3. A device according to Claims 1 or 2, characterised in that the source of radiation consists of a number of pieces of a wire of radio active material arranged in line and separated by short gaps.

4. A device according to Claims 1 or 2, characterised in that the source of radiation consists of a continuous flexible thin wire.

5. A device according to any of Claims 1 to 4, characterised in that the radio active element is coated directly with a non-oxidising metal layer, preferably gold.

6. A device according to any of Claims 1 to 5, characterised in that cobalt or another gamma radiation means is used as the radio active material.

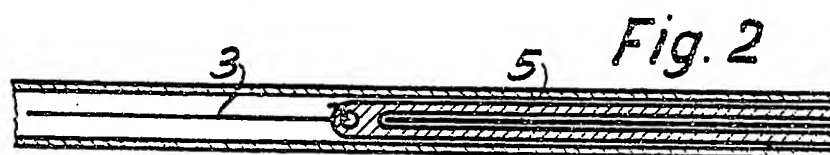
7. A device according to Claim 1 and substantially as either of the two embodiments herein described with reference to the accompanying drawing.

For the Applicant:

SYDNEY E. M'CAW & CO.,

Chartered Patent Agents,

17, St. Ann's Square, Manchester, 2.



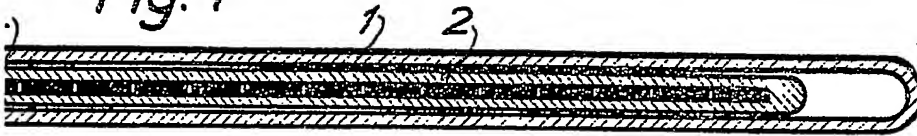
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COMPLETE SPECIFICATION

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*Fig. 1*

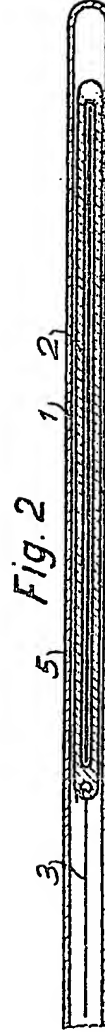


*Fig. 2*



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